Different paths towards sustainable biofuels?

VALORISATION ADDENDUM

1. Societal Relevance

The research on the regulation of the sustainability of biofuels has a pivotal societal relevance with a view on a prevalent pursuit for low-emission and sustainable energies. The Paris Agreement adopted at the UNFCCC COP21 in December 2015 galvanized the long-term goal of achieving balance between anthropogenic greenhouse gas emissions in the second half of this century.[1] Declaration of this long-term goal is acclaimed as sending a signal for an irreversible trend of replacing fossil fuels with low-emission and sustainable energies.[2] Such a momentum has also culminated in the series of renewable energy initiatives or alliances launched under auspices of the Lima-Paris Action Agenda (LPAA).[3] In face of the rush towards a fossil-free economy and society, it is high time we reflect upon what 'clean' and 'sustainable' energy should be promoted and to what extent law and policy on climate and energy may ensure environmental and socio-economic sustainability in the production and consumption of energy. In this sense, biofuels provide a valuable case study.

Biofuels have been promoted by governments for decades as an affordable substitute for fossil fuels, in an attempt to reduce dependence on oil import, reduce

1 Paris Agreement, Art. 4(1).

2 See, for example, Kumi Naidoo, 'COP21: shows the end of fossil fuels is near, we must speed its coming', (Green Peace International, 12 December 2015), available at: <www.greenpeace.-org/international/en/news/Blogs/makingwaves/cop21-climate-talks-paris-negotiations-conclusion/blog/55092/> (last accessed 6 February 2016); John D. Sutter, 'This is the end of fossil fuels' (CNN, 14 December 2015), available at: <http://edition.cnn.com/-2015/12/12/opinions/sutter-cop21-climate-reaction/> (last accessed 6 February 2016).

3 The LPAA was launched in Lima at COP 20 which purported to build momentum to support a universal climate agreement at COP 21 in Paris. At COP 21, a quantity of renewable energy initiatives are reached and launched under spotlight of the LPAA thematic forum on energy, including the SIDS Lighthouses Initiative, the Global Geothermal Alliance, the Africa Renewable Energy Initiative, and the RE100 (Companies Leading with 100 Per Cent Renewable Energy). See more information at LPAA, Renewable Energy, available at: <http://newsroom.unfccc.int/lpaa/renewable-energy/> (last accessed 6 February 2016).

greenhouse gas emissions, while boosting rural economy; more recently, reducing GHG emissions in the transport sector has become the key objective. With increasing consumption and production of biofuels, they are increasingly subject to debates over the potential negative impacts on environmental and socio-economic sustainability. From an environmental perspective, the criticism concentrates on the ecological and climate change impacts during the process of producing biofuels, particularly with regard to the effects of land use changes. Apart from environmental concerns, biofuels are also criticised in view of negative social impact, since the feedstocks used for producing biofuels are mostly food sources and their diverted use for biofuel production may give rise to problems in food availability, land grabbing, and land use rights of local and indigenous communities. From an economic perspective, biofuels were assumed to create new economic opportunities for people in rural areas by increasing the demand for and prices of agricultural products, but the economic viability and benefits may have been overestimated, and many studies demonstrate resource efficiency problems with regard to certain types of biofuels when the input of energy and resources for producing biofuels is considered. Furthermore, the environmental, social, and economic facets can be intertwined – the environmental impacts might incur socio-economic problems and vice versa. Therefore, by looking into the regulatory approach to biofuels in response to the sustainability concerns, this research may question if and how 'sustainable' energy needs to be defined.

In fact, sustainability of biofuels has been addressed already in many regulatory frameworks. For example, sustainability of biofuels is considered under a number of domestic regulatory frameworks such as the US, Switzerland, Brazil, Germany, the UK, and the EU.[4] At an international level, instruments have been adopted under auspices of, for example, the Convention on Biological Diversity to specifically address the relation between biofuels and biodiversity. Moreover, sustainability of biofuels is an extremely cross-cutting issue, involving not only climate and energy law but also regulation relating to, inter alia, agriculture, forestry, land use, and biodiversity. Moreover, the long-lasting environmental and societal problems, such as unsustainable farming, biodiversity and carbon stock loss, and social injustice, underlie the negative effects of biofuels. Thus, there is a need to explore and map the regulatory terrain, and analysis of the key measures affecting demand and supply of biofuels may offer an opportunity to reflect on how sustainability can be regulated and safeguarded by law. Fully aware that one dissertation does not have time or space to look into all the existing measures, this research chose to concentrate on regulatory approaches of the EU and China as well as related international treaty regimes, for the following reasons. Firstly, both the EU and China have become the leading consumers and producers of biofuels, and have adopted regulatory measures in different ways to tackle potentially negative impacts. Secondly, as there is not yet a unified definition of the sustainability of

4 A review of these regulatory measures has been made by under the FAO BEFS approach. Food and Agriculture Organization (FAO), Bioenergy and Food Security (BEFS), A Compilation of Bioenergy Sustainability Initiatives, available at: <www.fao.org/energy/befs/compilation/en/> (last accessed 10 February 2016).

biofuels, the examination and comparison of the EU and Chinese biofuel regulations may provide insight into how the two different legal systems integrate different sustainability concerns related to biofuels. Thirdly, the sustainability of biofuels is not a completely domestic issue and may have international or global ramifications, considering the effect on GHG emissions and biodiversity due to land use changes, so mapping the international setting may reveal what regulation exists for addressing sustainability of biofuels within the current international treaty regimes.

2. Target Group

This research is first and foremost relevant with policy makers in various areas. In the development of biofuels, the governmental policy and support have acted as the main drives for both the demand and supply of biofuels on market through, for instance, mandate of biofuel blending or energy tax exemptions. With mounting evidences of sustainability concerns, the question is if and how such regulatory instruments take into account the sustainability concerns and constrain the demand and supply of unsustainable biofuels. This thesis concentrates on the regulation which is promulgated by government or inter-governmental international regimes. In view that the biofuel issue involves multiple governmental departments – at least energy, agriculture, and climate change – this thesis adopts a 'demand-supply-trade' analytical model for understanding, mapping, and analysing a mix of regulatory measures in a more systematic and coherent manner. Moreover, by comparing biofuels regulation in the EU, China, and international regimes, this research may provide policy makers with a multi-level and global perspective in reflection on biofuel policies. Based on the comparative analysis, this research not only points out the insufficiencies in the current biofuel regulation, but also puts forward recommendations in view of the challenges and complexity of regulating sustainability of biofuels.

This research could be of great interest to organisations and scholars who attach attention to biofuels. Many regional as well as international inter-governmental organisations have noted or produced reports on sustainability issues of biofuels, such as those of International Energy Agency (IEA),[5] United Nations Environmental Programme (UNEP),[6] Food and Agriculture Organization (FAO),[7] and World Bank.[8] Furthermore, many organisations have contributed to developing indicators, criteria, and principles for the sustainability of biofuels, such as the Global Bioenergy Partnership (GBEP)[9] and FAO.[10] Sustainability of biofuels has also

5 International Energy Agency (IEA), 2011.
6 United Nations Environment Programme (UNEP), 2009.
7 Elbehri, Segerstedt & Liu 2013.
8 Rajagopal & Zilberman 2007.
9 Global Bioenergy Partnership (GBEP), 'The Global Bioenergy Partnership Sustainability Indicators for Bioenergy', First Edition, December 2011, available at: <www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/Indicators/The_GBEP_Sustainability_Indicators_for_Bioenergy_FINAL.pdf> (last accessed 9 February 2015).
10 The FAO has developed Bioenergy and Food Security (BEFS) approach to include a multidisciplinary and integrated set of tools and guidance on sustainability of biofuels. Food →

been a topic cared for by a number of non-governmental organisations such as the International Union for Conservation of Nature (IUCN), the World Wide Fund for Nature (WWF), and European Environmental Bureau (EEB). Particularly, the environmental non-governmental organisations such as ClientEarth have lodged lawsuits relating to biofuels against the European Commission. Moreover, there have been increased discussions in legal literature on how biofuels are and can be regulated to avoid unsustainable consequences. Building on the previous studies and resources, this research aims to engage an analysis that looks into the sustainability issue of biofuels from a legal perspective and in a comparative and holistic approach.

Furthermore, this research may interest enterprises or industry associations in businesses relating to biofuels. As governmental support has played a critical role in the market penetration of biofuels, the biofuel industry is highly sensitive to regulatory and policy changes. In turn, how to balance the protection of existing investment and the prevention of environmental or socio-economic hazards is an important factor to be considered in the policy making of governments. Hence, this thesis may provide insight into the state-of-the-affairs of the regulatory progress in the EU, China, and international regimes, and its implications for the demand, supply, and trade of biofuels.

3. Activities/Products

This thesis is primarily based on a desktop research. Academic literature provides the major resources for information and arguments, which was accessed through sorting through the legal databases provided by Maastricht University's library, such as the HeinOnline, SSRN, Westlaw, and Picarta. The research has also referred to resources and publication from reports and studies of international organisations, non-governmental institutes, and scientific bodies. Regulatory documents and instruments were primarily accessed on the websites of the issuing authorities, and international instruments were obtained on the official websites of the issuing international treaty regimes and the United Nations Treaty Collection database. Besides desk research, face-to-face interviews, email correspondence, and news from media provided an additional source of information for this thesis. Interviews were carried out with biofuel policy officers from the European Commission DG Climate Action, Chinese experts on environmental and climate law, and biofuel consultant from ECOFYS. Information from the European Commission has also been sought by sending questions via the EUROPE DIRECT Contact Centre. News from the EurActiv was subscribed in order to keep abreast with the latest EU legislative and policy progresses.

The output of this research is the conclusions and recommendations regarding how sustainability of biofuels is and can be regulated. It is mentioned above that the analysis on the differences and similarities of regulation is problem-oriented, and its

and Agriculture Organization (FAO), Bioenergy and Food Security (BEFS), available at: <www.fao.org/energy/befs/en/> (last accessed 10 February 2015).

conclusion aims to reveal the implications for exploring the potential of an inclusive regulatory approach on a global scale. Therefore, based on the differences and limits partly owing to the inherent complexity of regulating the sustainability of biofuels, it is recommended that inclusive regulation is needed to prevent unsustainable biofuels from being produced and consumed in a global view by fostering a harmonisation, integration, transplantation, and convergence between different regulatory levels.

4. Innovation

A literature review reveals that attention to biofuels has frequently concentrated on one sustainability concern such as biodiversity or GHG emissions, while the other concerns are not equally addressed in the meantime. Moreover, literature has usually focused on the regulation of developed legal systems such as the EU, while regulation in less developed legal systems such as China is less examined. Meanwhile, recent literature focuses more on governance approaches featured with private standard and certification, but the regulation of the government still deserves detailed examination and analysis. Thus, this research examines regulation relating to the major sustainability concerns in both environmental and socio-economic aspects.

Furthermore, in addition to following the traditional comparative law approach of exploring regulation in at least different jurisdictions, determining their similarities and differences, explaining the causes and evaluating the solutions, the comparative study in this thesis is a functional comparison that identifies problems and effects as the yardsticks and views the even doctrinally different institutions as functionally equivalent and comparable. In the end, instead of determining which law is 'better' or arguing for an international legal unification on biofuels, the observations from comparative analysis will provide the basis for answering the question of how the sustainability of biofuels is regulated to avoid or minimise the potential negative impacts in a global inclusive approach, based on the implications from the conceptual framework of 'global environmental law' which depicts a dynamic process of 'convergence', 'transplantation', 'harmonization' and 'integration.'

5. Schedule & Implementation

This research may provide food for thought or be extended for future studies in the following ways. Firstly, exploration of the regulation in the specific case of biofuel's sustainability can be extended to the other bioenergy sectors (i.e. biomass for electricity, heating, cooling) or even the bio-economy as a whole which may have similar problems of negative environmental or socio-economic impacts, particularly when the case of biofuels shows that a sufficient evaluation of the sustainability impacts on various scales is crucial before any support policy is made. Secondly,

this research has provided a normative analysis of the regulation on the sustainability of biofuels from the perspective of whether sustainability concerns in the environmental, social, and economic dimensions are inclusively addressed, while further studies could be carried out to analyse how to reach a trade-off or balance between impacts of the three dimensions. Thirdly, the sustainability of biofuels is a cross-cutting issue which involves regulation in many other relevant sectors such as land management, agriculture, and even forestry, and the unsustainable production of biofuels in effect reflects some root problems such as land use changes, unsustainable agriculture, and deforestation in these sectors, so more research is needed to address these root problems. Fourthly, this research suggests and sketches an inclusive approach that fosters the evolution of a common understanding and convergent regulation by harmonisation, integration, transplantation, and convergence, and further study on viability and functioning of such an approach is needed, particularly regarding the role to be played by public-private partnership and co-regulation. Fifthly, valorisation opportunity lies in developing and implementing standardisation and certification frameworks for sustainability of biomass in a trend of 'bio-based economy',[11] and there is opportunity of combining mandatory criteria and voluntary verifying schemes and establishing public-private partnerships[12]in this regard. The schedule for implementing these potential research projects depends largely on further funding opportunities.

11 For example, the OECD has issued a document entitled 'The Bioeconomy to 2030: Designing a Policy Agenda', and in 2012 the EU presented the strategy of 'Innovating for Sustainable Growth: A Bioeconomy for Europe.' Besides, many countries have either published separate strategies and policies relating to bio-based products and industries, or developed strategies that collect all separate topics under the conceptual umbrella of bioeconomy. Staffas, Gustavsson & McCormick 2013, p. 2752.

12 James Crisp, 'Council rubber stamps private-public partnerships in biomass, air, energy, electronics, medicine' (EurActiv, 7 May 2014), available at: <www.euractiv.com/sections/-innovation-enterprise/council-rubber-stamps-private-public-partnerships-biomass-air-energy> (last accessed 7 February 2016).